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THE KNOWLEDGE OF ADULT WOMEN IN MAMBANG VILLAGE ABOUT FEMALE INFERTILITY

Dhaanavendharanpuvanthiran[1], Bagus Komang Satriyasa[2], I Made jawi[2], Suchindradewi[2]

[1]Medicine and Doctor Profession, Medical Faculty of Udayana University, Denpasar, Bali

[2]Department of Pharmacology and Therapy of Udayana University, Denpasar, Bali

Corresponding author: Dhaanavendharanpuvanthiran [1]

Medicine and Doctor Profession, Medical Faculty of Udayana University, Denpasar, Bali

Abstract: **Infertility is being considered as the worldwide health problem however the level of knowledge among them is still poor. It has also been observed that most couples have a basic knowledge of factors affecting fertility, also the options that are available for women with infertility.**

Aim : This study aims to assess the level of knowledge of adult women in Mambang village and several factors that might influence their level of knowledge.

Method : This study is an analytical crossectional study, which using a primary source of data from electronic questionnaires. Women from Mambang Village, Tabanan, Bali who aged from 20 to 40 years old are included in this study. Those who are voluntarily refusing to participate in this study are excluded from this study.

Result : The level of knowledge about women infertility in Mambang Village is still low with only 36.2% of participant who are considered as having a high level of knowledge about infertility. We assess the correlation between the women' age, occupation, education background and family socio-economic status. It is found that there are a low significant correlation between women' occupation and the level of knowledge about infertility (r=0.330; p=0.020). There are no significant correlation between the rest variables.

Conclusion : The level of knowledge about women infertility is still low in Mambang Village. Women' occupation might influence their level of knowledge about infertility. Further longitudinal study should be done to assess the risk factor of low level of knowledge among Mambang Village' adult women.

Keywords: **infertility, female reproduction, knowledge of infertility.**

1. INTRODUCTION

Infertility is defined as a failure to achieve pregnancy, maintain the pregnancy that bring to a live born after 12 months or more of regular unprotected sexual intercourse.[1] Infertility is being considered as the worldwide health problem with the estimated that around 48.5 million couples are infertile in 2010, where 19% of women aged 20-44 years old have tried to maintain their pregnancy to successfully deliver baby and 10.5% have never gotten pregnant.[2] Newer study found out that female infertility is accounted for around 40% of total infertility.[3-4] The prevalence of infertility in Indoesia is estimated around 21.3% from total population where 10-15% of the cases was causes by female infertility.

There are many different risk factors that can play a huge part when it comes to female fertility. Some internal factors can play a role in female infertility such as anovulation (52.05%), tubal factor (41.52%), and uterine factor (2.05%).[3] The other factors are modifiable such lifestyle choices and environmental causes that can attribute to an infertility diagnosis.[5]

Some major risk factors that should be taken into consideration are increasing age, excessive, or very low, body fat, chronic diseases, such as diabetes, hyper or hypothyroidism, lupus, arthritis, hypertension, or even asthma. There could also be environmental factors for cigarette smoking or alcohol consumption, exposure to workplace hazards or toxins.[6]

There are various consequences from infertility that can affected the sufferer both physically and mentaly. Though it is rarely considered a health issue of serious concern, infertility can lead to distress and depression, as well as discrimination and ostracism in certain cultures.[7] Women infertikity can also cause psychological problems in both partners as decreased self-respect, isolation, loneliness, loss of self control, and feeling of sexual insufficiency. Having a child is the basic cultural, and sexual norm of many communities. Therefore, couples experiencing the problem of infertility may be marginalized under social pressure, excluded from the society, and become isolated. Especially in traditional societies having a child is the determinative factor of the women's social status, therefore infertile women may feel the social stigma more strongly.[8]

Although infertility, especially among women can cause a lot of problem for them, unfortunately, the level of knowledge among them is still poor.[9] It has also been observed that most couples have a basic knowledge of factors affecting fertility, but remain unaware of the impact that advancing age has on a women's fertility.[10] Lack of knowledge, and misinformation about infertility may jeopardize reproductive health of the individuals. It has been seen that in many prevalent health problems, increase in the knowledge level about symptoms, and preventable factors, decreases the relevant risks, and delay in search for medical help. Awareness of risk factors about infertility and timely search for medical help among individuals who want to have children are closely related to their having sufficient level of knowledge. It has been also believed that increase in the level of knowledge about infertility may render similar benefits, and decreases the problems which probably may be experienced by individuals (Siyez et.all, 2018). Because of the lack of fundamental knowledge about infertility, its causes, and possible treatment alternatives, it has reportedly higher incidence rates in underdeveloped countries.[8]

Based on some previous literature that have been published, women who live in rural area tend to have lower knowledge about infertility compare to those who live in a big city (Haque et.all, 2014; Nayak et.all, 2017; Harfiz et.all, 2019).[11,12,13] Unfortunately, there has not been any study that explain the level of knowledge about women infertility among adult women yet in Bali's rural area, especially in Mambang Village, Tabanan. Therefore, author interested in assessing the level of knowledge and factors that influence the knowledge among adult women there.

2. METHODS

This study using an analytical cross-sectional study design which doesn't require any follow up study. The data can be taken within one period of time. The research will used primary data based on questionnaires given to a random set of adult women in Denpasar, Bali are from ninth to eleventh of December 2020. The design of this research explores a form of formal standardised questionnaires to test and quantify the hypothesis. Samples taken using consecutive sampling techniques, where the samples used in this study must meet the inclusion and exclusion criteria that have been determined unti reach the required number of samples. The inclusions criteria are female of Mambang Village, Bali, Indonesian origin aged 25-40 years old. Research variables are age, marriage status, marriage period, parity, level of education, occupation, monthly household income, socioeconomic status, female infertility knowledge.

3. RESULT AND DISCUSSION

This study has done by distributing an electronic questionnaires in the form of "Google Form" that contains a total of 19 questions, include 9 questions regarding women' demographics data and 10 questions regarding their knowledge about female infertility. The questionnaire has been distributed to the woman aged 25-40 years old in Mambang Village, Tabanan, Bali. A total of 69 women voluntarily participated in this study, which has already exceeded the minimum sample size requirement for this study. They reported no problem while answering the questionnaire and they could understand every question that are included in the questionnaire.

The women that were included in this study have an age range of 25 – 40 years old, where most of the participant belong to the age group of 36-40 years old (37.7%), followed by 31-35 years old (24.6%), 26-20 years old (21.7%) and 20-25 years old (15.9%). In terms of the occupation status, more women are unemployed compare to the private employee and entrepreneur (36.2% vs 34.8% and 29.0%). Most women are having an education in senior high school (49.3%) and unfortunately there are still 8.7% of women in Mambang Village who are uneducated. Complete data can be seen in table 1.

Table 1: Demographic Characteristics of the Study Sample

Demographic Characteristics	F(%)
Age	
• 20-25	11 (15.9)
• 26-30	15 (21.7)
• 31-35	17 (24.6)
• 36-40	26 (37.7)
Women' Job Status	
• Unemployed	25 (36.2)
• Private Employee	24 (34.8)
• Entepreneur	20 (29.0)
Women' Education Status	
• Uneducated	6 (8.7)
• Junior High School	26 (37.7)
• Senior High School	34 (49.3)
• Diploma	3 (4.3)
• Under/Post Graduated	0 (0.0)

As mention before in the previous chapter, infertility is defined by the failure to establish a clinical pregnancy after 12 months of regular and unprotected sexual intercourse. Questions about the period of the marriage and parity have been asked to the participant, and it is found that 11.6% of the participant are considered to be infertile. The number of the children that participant have range from 0 to 6, with the mean of 1.81 $\pm$ 1.1 children, whereas the marriage period varied from 3 months to 25 years with the mean of 10.73 $\pm$ 5.8 years. Both the variables have been assessed by *Kolgomorov smirnov* and show that they are abnormally distributed ($p<0.05$), thus the median and IQR will be showed on the table 2.

Table 2: Infertility State of the Study Sample.

Infertility	F(%)
Parity (median, IQR)	9.0; 9.0
Period of Marriage (median, IQR)	2.0; 4.0
Infertility State	
• Fertile	61 (88.4)
• Infertile	8 (11.6)

The socio-economic status is assessed by scoring the husband' occupation, level of education and total family monthly income. Total score then classified into 2 groups where participants who scored more than 7 will be grouped into high socioeconomic status. Almost half of the participant' husband are entrepreneur (46.4%) followed by private employee (40.6%) and unemployed (13.0). Most of the husband are high school graduates (49.3%) followed by junior high graduates (18.8%), diploma (17.4%) and university graduates (14.5%). None of them are having no education. The vast majority of the respondents having less than 3 millions IDR per month (87%) while only 1 participant who is able to earn more than 5 millions IDR per month. The total score among participants are varied from 5 to 11 with the mean of 7.75 $\pm$ 1.3. Total score of socioeconomic status has been assessed by *Kolgomorov Smirnov* test and proven to be abnormally distributed ($p<0.05$) thus the median and IQR will be shown in the table. The total score were abnormally distributed ($p<0.05$). Based on the classification, it is found that more than half of the participants having high socioeconomic status (52.2%), while the rest having low socioeconomic status. Complete data can be seen in the table 3

Table 3: Stress Profile of the Study Sample

PSS	F(%)
Husband' Job Status	
• Unemployed	9 (13.0)
• Private Employee	28 (40.6)
• Entrepreneur	32 (46.4)
Husband' Education Status	
• Uneducated	0 (0.0)
• Junior High School	13 (18.8)
• Senior High School	34 (49.3)
• Diploma	12 (17.4)

• Under/Post Graduated	10 (14.5)
Monthly Income	
• < 3.000.000 IDR	60 (87.0)
• 3.000.000-5.000.000 IDR	8 (11.6)
• > 5.000.000 IDR	1 (1.4)
Sosio Economic total score (median, IQR)	8.0; 1.00
• Low (0-7)	33 (47.8)
• High (8-13)	36 (52.2)

This study is using 10 questions to assess the women' knowledge about infertility that can be seen on questionnaire attachment. Most of the questions only have a small percentage of correct answer, except for questions number 6 (Do you think that alcohol consumption is a risk factor of women infertility?); number 5 (Do you think that smoking is a risk factor of women infertility?); number 8 (Do you think that maintaining a healthy weight can help to get women pregnant?); and number 7 (Do you think diabetes and hypertension are risk factors of women infertility?) where more than half participants answer those questions correctly (71.0%, 62.2%, 56.5% and 52.2% respectively). Question 10 which asking about surrogating get the highest "Don't Know" answer with the percentage of 58%. Complete data can be seen in table 4

Table 4: Knowledge about the Women Infertility

	Questions	Correct	False	Don't Know
Q1	Infertility definition	15 (21.7)	29 (42.0)	25 (36.3)
Q2	Age of infertility	20 (29.0)	28 (40.6)	21 (30.4)
Q3	High body weight as infertility risk factor	36 (52.2)	16 (23.2)	17 (24.6)
Q4	Low body weight as infertility risk factor	24 (34.8)	20 (29.2)	25 (36.2)
Q5	Smoking as infertility risk factor	43 (62.3)	0 (0.0)	26 (37.7)
Q6	Alcohol as infertility risk factor	49 (71.0)	20 (29.0)	22 (31.9)
Q7	Chronic diseases as infertility risk factor	36 (52.2)	11 (15.9)	22 (31.9)
Q8	Maintaining body weight can help with infertility	39 (56.5)	9 (13.0)	21(30.4)
Q9	Option for infertile women	12 (17.4)	26 (37.7)	31 (44.9)
Q10	Knowledge about surrogacy	19 (27.5)	10 (14.5)	40 (58.0)

Every correct answer will be scored as 1 whereas the wrong and don't know answer will be scored as 0. The total score then classified where participant who get score more than 5 will be classified as having high level of knowledge about women infertility. The total score that participant have achieved are varied from 0 to 10. The mean of the score is 4.25 $\pm$ 2.8. The score then assessed by *Kolgomorov Smirnov* test, and found that the data is not normally distributed thus the median and IQR will be shown on the table. According to the classification, there are more than half participant who have a low level of knowledge about women infertility (63.8%) whereas only 36.2% who are considered to have a high level of knowledge about women infertility. Complete data can be seen in table 5.

Table 5: Women Level of Knowledge about Infertility

PSS	F(%)
Level of Knowledge total score (median, IQR)	4.0; 4.50
• Low (0-5)	44 (63.8)
• High (6-10)	25 (36.2)

This study assess the correlation between participant' age, occupation, education and socioeconomic status and the level of knowledge about women infertility. The data analysed by using *Chi Square* for 2x2 tabulation and more than 2x2 tabulation. Age and education variables could not achieved the requirement of *Chi Square* test because they have table with less than 5 expected frequency, therefore those variables were reclassified into two grouped. Participant who aged 20-30 years old are considered younger population while those who aged 31-40 years old are considered older. Uneducated women and women who graduated from junior high are classified into low education whereas those graduated from high school and having a diploma degree are classified as having high education.

It is found that women' occupation having a low significant correlation with their knowledge about women infertility (r=0.330; p=0.020), where we can see that 84% of uneducated women have low knowledge about infertility. The other variables do not show any significant correlations with level of knowledge about women infertility. Complete data can be seen in table 6.

Table 6: Factors Influence Women' Knowledge about Female Infertility

	Level of Knowledge		r	p
	Low (n=44)	High (n=25)		
Age				
• Younger (20-30y/o)	15 (57.7)	11 (42.3)	-0.098	0.287
• Older (31-40y/o)	29 (67.4)	14 (32.6)		
Women' Occupation				
• Unemployed	21 (84.0)	4 (16.0)	0.330	0.020*
• Private employee	14 (58.3)	10 (41.7)		
• Entepreneur	9 (12.8)	11 (55.0)		
Women' Education				
• Low Education	22 (68.8)	10 (31.3)	0.096	0.292
• Higher Education	22 (59.5)	15 (40.5)		
Socio-economic Status				
• Low	22 (66.7)	11 (33.3)	0.058	0.410
• High	22 (61.1)	14 (13.0)		

4. DISCUSSION

This study found that the level of knowledge about female infertility among adult women in Mambang Village is still low where only 36.2% of women who have a high level of knowledge about female infertility. A previous study that has been done in Jakarta and Sumba showed that a level of knowledge about infertility in Sumba (rural area) is lower than Jakarta (urban area) which was 93.4% vs 33.1% respectively.[13] This result also familiar with the study done in Pakistan where they only found that 25% of participant have a high level of knowledge about women infertility. Some of them even believe that black magic and supernatural causes are the culprit between women infertility.[14] Similarly, the study that has been done in Saudi' rural area also found that 59% of their participant have a low level of knowledge about female infertility.[15]

In this study, in general participants did not know about the management and treatment of women infertility (question number 9 and 10). This result also similar with the study that has been done by Harzif et.all in 2019 where people in rural area tend to not know the options that are available for the infertile women, most of them think that divorce and remarry are the only way to solve the infertility problem.[13] Similar result shown by another study where it is found that medical treatment of infertility is less favorable than conventional way such as divorcing the woman or marriage to the second wife (38.5% vs 62.5% vs 86.2%; $p<0.0001$). Around 61% of the participants even belief in performing exorcism to heal the infertility among women.[15] This is also supported by Ali study where he found that most women do not really understand about In-Vitro Fertilisation (IVF) due to a very limited options in the country where they live. Some of them who know also rejected the idea due to their belief that a procedure that use foreign egg or sperm might be forbidden.[14]

Overall, women in Mambang Village have a good knowledge about the risk factors of female infertility. They mostly realized that body weight can have an impact of women infertility, therefore they also believed that maintaining a healthy body weight might help women with infertility. A previous study done by Malikarjuna et.all in 2015 where they found that the women with BMI more than 25kg/m2 can increase the risk of getting infertile 3.8 fold compare to the normal BMI ($p=0.004$).[16] Obesity is related to the high level of leptin where it can stimulates estrogen synthesis in luteinized granulosa cells and reduces progesterone synthesis in insulin stimulated theca cells. Leptin inhibits insulin-induced ovarian steroidogenesis by acting on the theca and granulosa cell receptors. Leptin also inhibits LH-stimulated estradiol production by the granulosa cells. The other effect of leptin on reproductive functions is the regulation of early embryo cleavage and development.[17] In obesity, the increased levels of insulin and leptin lead to insulin and leptin resistance that, together with the reduced adiponectin levels, contribute to a dysregulation of both the HPG axis and ovarian steroidogenesis, by further impairing the 17β-estradiol and progesteron synthesis, increased testosterone synthesis and free levels due to reduced SHBG synthesis and impairing ovarian function.[18,19] Suprisingly, it is not only overweight that can cause infertility, underweight can also cause an infertility among women. Being underweight can cause your body to stop making estrogen. This can cause irregular menstrual cycles. Ovulating and getting period can be stopped as consequences of this event. This statement is especially valid when losing weight is caused by not eating enough or excessive exercise, which may be signs of an eating disorder like anorexia nervosa.[20]

In this study, women also believe that smoking and alcohol intake could lead to the infertility. Previous literature agree that a routine consumption of alcohol among female can lead to the infertility. A meta-analysis study shows that alcohol consumption can increase the risk of infertility as much 0.87 fold (95% CI 0.78–0.95). They also found a dose related risk where it is suggested that there is a linear association between decreased fertility in every 12.5 g/day increasing in alcohol consumption (RR 0.98; 95% CI 0.97–0.99).[21] Both smoking and alcohol may reduce fertility through alternating the endogenous hormone concentrations such as total estrogen, which lead to a reduce FSH secretion suppressing folliculogenisis, ovulation and the amount of bioavailable estrogen. Another possible cause could be that alcohol has a direct and negative effect on ovum maturation, ovulation, early blastocyst development and implantation.[18,21]

This study found a negative correlation between the age group and level of knowledge about infertility, however this correlation is not statistically significant (r= -0.098; p=0.287). It is shown that 42.3% of women with younger age have a high level of knowledge about infertility, whereas 67.4% from the older group have a low level of knowledge about infertility. A previous study that has been done in India shows that women in younger group tend to have a higher knowledge index compare to those who are older (OR: 5.75; p<0.0001). They speculate that the younger population might get a higher knowledge due to their easier access towards online media, where they also found there is an increase chance of having higher knowledge about infertility as much as 5.88 fold in women who get more exposure to media (p<0.001).[22] Another study found younger women, especially the adolescence have a better knowledge about infertility where 79% of them have a good level of knowledge about infertility.[23]

This study found low positive significant correlation between women' education and their level of knowledge about infertility (r=0.330; p=0.020). It can be seen that 84% of unemployed women have a low level of knowledge about infertility, whereas only a smaller percentage of women who are private employed and entrepreneur have a low level of knowledge about infertility (58.3% and 12.8% respectively). This result is similar with Albofotouh study where it is found that there is a significant correlation between women' occupation and their level of knowledge about infertility where 69.5% of participant who are employed having a high level of knowledge about infertility (p<0.001).[24] Similar result also shown by Whiltshire et.all study in 2019 which found that women with paid employement are having more score on their knowledge index (41.58 + 20.84 vs 33.05 + 18.78; p=0.001), they also have more positive attitude towards the treatment of infertility. It is believed that women with better occupation tend to have more intelligent friends and inner circle who can share more information compare to those who are unemployed. Beside better occupation is also closely related with better education level and social-economic status which could indirectly affect their knowledge about infertilitY.[7]

This study found a positive correlation between the education group and level of knowledge about infertility, however this correlation is not statistically significant (r= 0.096; p=0.292). It is shown that 42.3% of women with lower educational status also have a low level of knowledge about infertility; however 59.5% of women with higher education oddly have a low level of knowledge about infertility. According to a study that has been done in Pakistan rural area, women with lower educational status tend to have lower level of knowledge about infertility where they mostly think that the causes of infertility is supernatural and evil spirit whereas the higher educated women are able to acknowledge that nutrition, lifestyle, marital and psychosexual factors are responsible for women infertility.[14] However the similar result with this study also shown by Albofotouh, there are no significant correlation between educational level and women' knowledge about infertility. They found that the ratio between women with higher secondary education who have low and high level of knowledge about infertility was almost 1:1.[24] This study result in an insignificant correlation between higher level of education with higher level of knowledge about infertility might be caused by the lack of sex education that has been thought in the formal education. This fact is also mention by Patra & Unisa study that shows that most of their participant admitted that they barely learn about infertility, fertility or any other sexual related education in the formal schooL.[22] A study that has been done among university students also shows a surprising result where they tend to be less knowledgeable about risk factors of infertility such as age and body mass index although some of them know about the substances related infertility. This is perhaps caused by a different material that are taught towards students in different major, therefore those who are majoring outside the life science will more likely to have lower knowledge of infertility. This is also one of the proofs that infertility is still not being included in the universal formal education syllabus.[8]

This study found a positive correlation between the socioeconomic group and level of knowledge about infertility, however this correlation is not statistically significant (r= 0.058; p=0.410). It is shown that 66.7% of women with lower socio-economical status also have a low level of knowledge about infertility; nonetheless, around 61.1% from the higher socio-economical status also have a low level of knowledge about infertility. This finding is quite different with other

previous studies. A study from Patra & Unisa found that women who have less wealth tend to have lower knowledge index about infertility (OR: 2.11; p<0.01) compare to those who are richer.[22] Mahey et.ll also shows the similar result where women with lower socio-economy status tend to have lower knowledge about infertility. They also found that knowledge of the need of donor oocytes and assisted reproduction in women of advanced age was better in higher socioeconomic classes. They were significantly more aware about surrogacy and its implications due to better education and more access to media and internet.[23] Both of them assumed that higher socio-economic status might have a correlation with higher educational level, better occupation and better exposure towards the informations therefore might increase women' knowledge about infertility.[22,23]

This study using a cross-sectional method where the data were taken on one period of time and there are no follow up for this study, therefore we can only see the correlation within the variable. In order to know about the risk factors, further cohort study should be taken into a consideration. The data were taken based on participants answer to the questionnaire which could create a bias due to participant' memories alteration. The limited amount of time that is used to do this study causes the limited number of sample that can be accessed.

5. CONCLUSION

From the data that have been described in the previous chapter, it can be concluded that there are low significant correlation between women' occupation and their level of knowledge about female infertility. It can also be concluded that the level of knowledge about female infertility among women in Mambang Village is still low. Further multicenter cohort study should be done to determine the risk factors of low level of knowledge about women infertility.

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